WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device, having a silicon layer disposed on an insulating film, the method comprising:

implanting oxygen ions into selected parts of the silicon layer; and

oxidizing the selected parts of the silicon layer, into which the oxygen ions have been implanted, to form isolation regions dividing the silicon layer into a plurality of mutually isolated active regions.

2. The method of claim 1, wherein the silicon layer has a thickness of at most seventy nanometers.

3. The method of claim 1, wherein the semiconductor device is a fully depleted silicon-on-insulator device.

4. The method of claim 1, wherein the isolation regions are field oxide regions.

5. The method of claim 1, wherein the implanted oxygen ions have a concentration that varies from an upper surface of the silicon layer to a lower surface of the silicon layer.

6. The method of claim 1, wherein the implanted oxygen ions have a peak concentration in a lower half of the silicon layer.

7. The method of claim 1, wherein implanting oxygen ions further comprises:

forming an oxide film on the silicon layer; and

implanting the oxygen ions through the oxide film.

8. A method of fabricating a semiconductor device, having a silicon layer disposed on an insulating film, the method comprising:

forming a first oxidation-resistant film on the silicon layer;

selectively removing the first oxidation-resistant film from parts of the silicon layer;

implanting oxygen ions into the silicon layer, using remaining parts of the first oxidation-resistant film as a mask; and

oxidizing the parts of the silicon layer into which the oxygen ions have been implanted, to form isolation regions dividing the silicon layer into a plurality of mutually isolated active regions.

9. The method of claim 8, wherein the silicon layer has a thickness of at most seventy nanometers.

10. The method of claim 8, wherein the semiconductor device is a fully depleted silicon-on-insulator device.

11. The method of claim 8, wherein the isolation regions are field oxide regions.

12. The method of claim 8, wherein the implanted oxygen ions have a concentration that varies from an upper surface of the silicon layer to a lower surface of the silicon layer.

13. The method of claim 8, wherein the implanted oxygen ions have a peak concentration in a lower half of the silicon layer.

14. The method of claim 8, further comprising forming an oxide film on the silicon layer, the first oxidation-

resistant film being formed on the oxide film.

15. The method of claim 14, wherein the oxygen ions are implanted through the oxide film into the silicon layer.

16. The method of claim 14, further comprising selectively removing the oxide film from said parts of the silicon layer before the oxygen ions are implanted.

17. The method of claim 8, wherein the first oxidation-resistant film comprises at least one of a nitride film and a photoresist film.

18. The method of claim 8, further comprising:

depositing a second oxidation-resistant film after the first oxidation-resistant film has been removed from said parts of the silicon layer; and

etching the second oxidation-resistant film to leave sidewalls on vertical edges of the remaining parts of the first oxidation-resistant film before the oxygen ions are implanted.

19. The method of claim 18, wherein the second oxidation-resistant film is an oxide film or a nitride film.